London Economics International LLC

Review of alternative electricity procurement processes for the provision of Delmarva Power's Standard Offer Service

Task 1 – Electricity Supply Procurement Assessment

Prepared for the the State of Delaware Public Service Commission Staff

Julia Frayer
Gabriel Roumy
Amit Pinjani
Jawahar Shah

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Agenda

1	**Introduction**
2	DPL's Standard Offer Service supply procurement
3	Results from DPL's past procurement processes
4	Summary of case studies
5	Economic assessment of alternative procurement methods
6	Discussion

LEI is seeking input from stakeholders to assist in its review of DPL's current SOS supply procurement approach

- London Economics International ("LEI") has been retained by the staff of the Delaware Public Service Commission to undertake a review of Delmarva Power and Light Company's ("Delmarva" or "DPL") current Standard Offer Service ("SOS") supply procurement approach - focusing on Residential and Small Commercial & Industrial ("RSCI") customers

- With this workshop, LEI aims to elicit stakeholder feedback on the current procurement approach and other alternatives available to DPL, which will then feed into recommendations

At this time, LEI does not offer recommendations as to how DPL's SOS supply procurement should be modified

Today's presentation is divided into two key parts

Presentation of LEI's assessment	Discussion
Present an assessment of DPL's current SOS supply procurement approach	Gather Stakeholder inputs on: • procurement objectives • possible changes to product procured • possible changes to procurement process
Compare Delaware SOS process with other jurisdictions	
Review alternative SOS supply procurement mechanisms	

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House Bill 6 provides the legislative framework for SOS procurement

SOS is offered to RSCI and other retail consumers who do not elect service from competitive retail suppliers

- Approximately 89% of RCSI load in the DPL service territory is served through SOS presently.

In April 2006, the Delaware General Assembly passed House Bill 6 to provide a framework for SOS

- DPL would become the sole SOS provider within the State
- DPL would be required to file an Integrated Resource Plan every 2 years
- The legislation set limits on the procurement of supply by mandating that at least 30% of supply come from the competitive marketplace

Subject to PSC approval, legislation grants DPL significant flexibility in selecting the method for procuring supply for its SOS customers

In order to meet its electric supply requirements, the legislation offers the SOS provider flexibility, subject to the approval of the Commission, to:

1. Enter into short- and long-term contracts for the procurement of power necessary to serve their customers
2. Own and operate facilities for the generation of electric power
3. Build generation and transmission facilities (subject to any other requirement in sections of the Delaware Code regarding siting and other issues)
4. Make investment in demand-side resources
5. Take any other Commission-approved actions to diversify its retail load

To ensure reliability, price stability, and low cost to consumers, DPL relies on a competitive process and laddered 3-year contracts

DPL uses a competitive process to procure the full requirements of eligible customers

RSCI customers SOS supply procurement process	
Procurement objectives	• Supply reliability • Price stability • Least cost to consumers
Annual process	One third of RSCI SOS load is offered annually
Contract term	3 year contracts
Product	Full Requirements Service ("FRS")

Laddering results in supply costs for a delivery period representing the average of prices from three procurement processes

RSCI SOS load	Delivery period	Delivery period	Delivery period	Delivery period	Delivery period
	June – May	June – May	June - May	June – May	June – May
Annual procurement One third of load					
Annual procurement One third of load		100% of load			
Annual procurement One third of load					
Annual procurement One third of load					
Annual procurement One third of load					

Full Requirements Service shifts all LSE obligations and market risks from the SOS provider to the suppliers

- **When providing Full Requirements Service, suppliers take on all obligations of a Load Serving Entity ("LSE")**
  - Network Integration Transmission Service is provided by Delmarva
  - Renewable Energy Obligations are unbundled from FRS

Full Requirements wholesale supply service	
Includes	**Excludes**
• Energy • Capacity • Ancillary services • Other load-related ISO fees • Losses	• Renewable energy obligations • Network integration transmission service

- **Winning suppliers are entitled to Delmarva's rights to Auction Revenue Rights ("ARR") up to the share of load they serve**

The reverse auction allows participants to compete as the auction unfolds and provides a separate clearing price for each block

The current SOS procurement format is a reverse auction mechanism

- A starting price is set for each block and allows potential suppliers to make and revise their offers for a set period of time
- All participants having submitted an offer are able to view the current low bid over the course of the auction and may submit a lower offer
- Essentially, a separate auction is held for each block (and a separate price is determined)

The RSCI SOS load is divided into blocks representing a specific percentage corresponding to about 50 MW Peak Load Contribution ("PLC")

The annual procurement process consists of 2 separate auction events

6 blocks, totaling one third of the DPL SOS RSCI total load, are auctioned every year in 2 separate auctions ("tranches")

- Auctions held in December and February
- Deliveries start the following June for 36 months

RSCI SOS load	Annual procurement		Annual procurement		Annual procurement	
	Tranche 1	Tranche 2	Tranche 1	Tranche 2	Tranche 1	Tranche 2
Blocks offered	Blocks 1-2-3	Blocks 4-5-6	Blocks 7-8-9	Blocks 10-11-12	Blocks 13-14-15	Blocks 16-17-18

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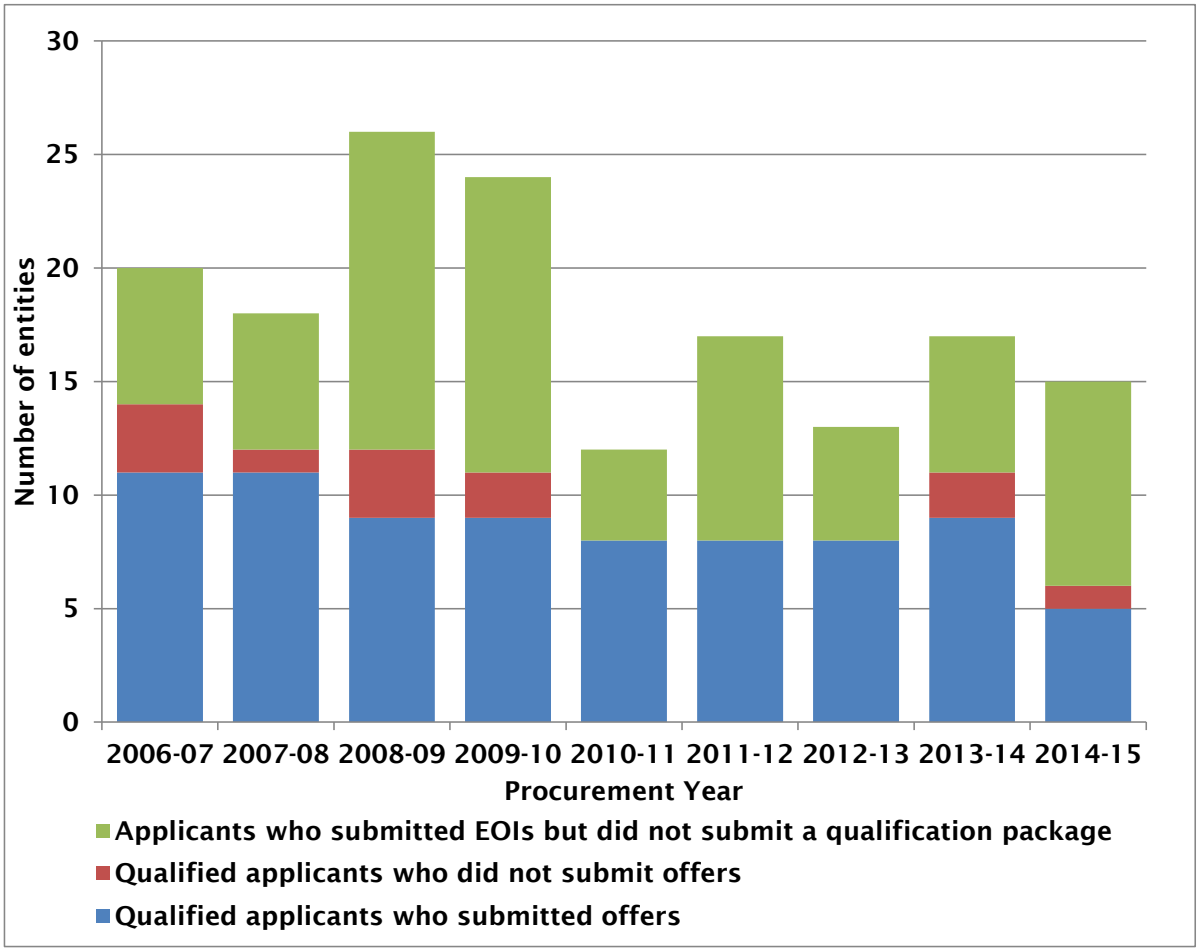
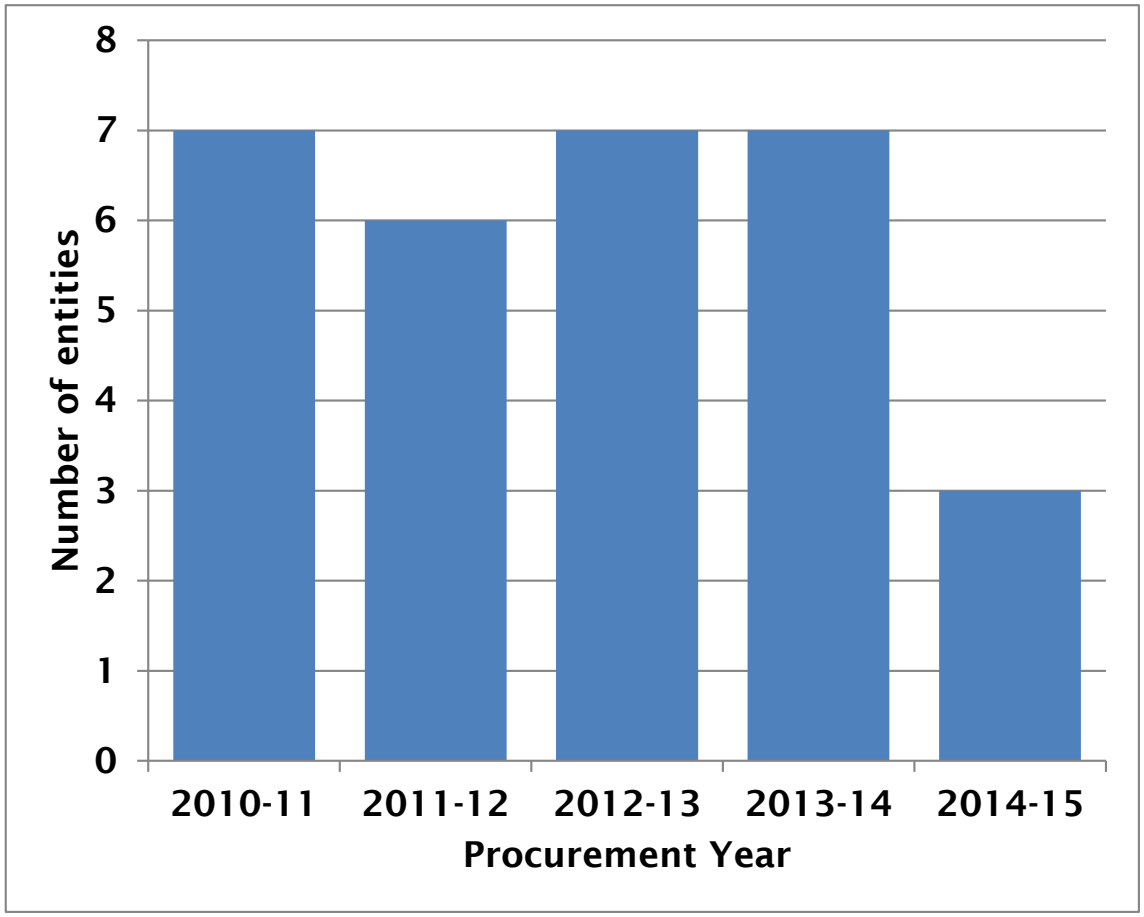
Historically, 6 – 7 qualified entities have submitted offers in DPL's procurement process; this number declined in the 2014-15 auction

Auction participation data by procurement year (all service type categories)



For RSCI customers, only 3 participants submitted offers in the 2014-15 procurement process

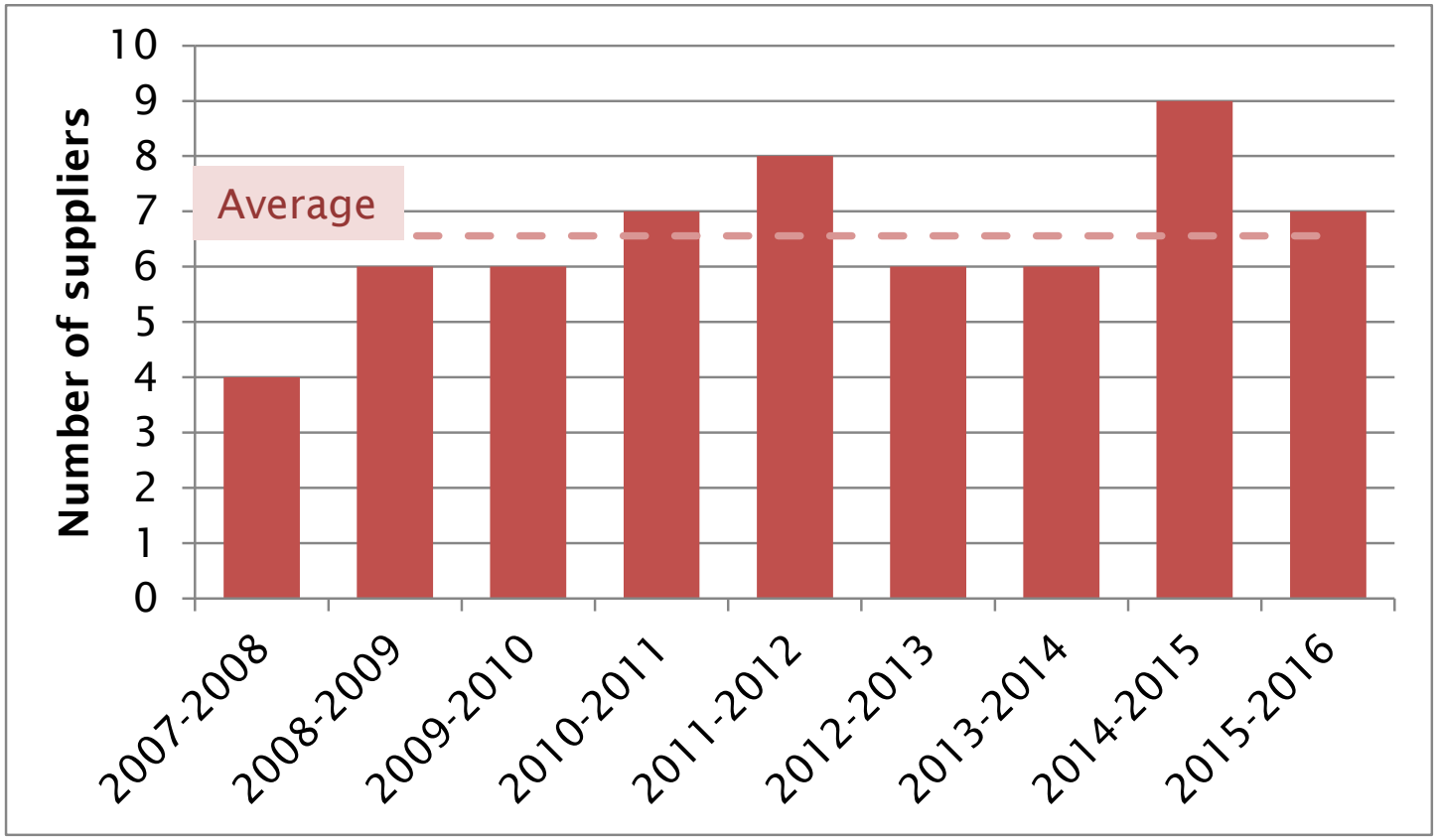
Qualified applicants submitting offers by procurement year (RSCI customers)



The number of different suppliers serving SOS customers in Delaware has been relatively constant since the early auctions

Historically, RSCI SOS load has been relatively evenly distributed between the different suppliers

Historical number of suppliers for the RSCI SOS load

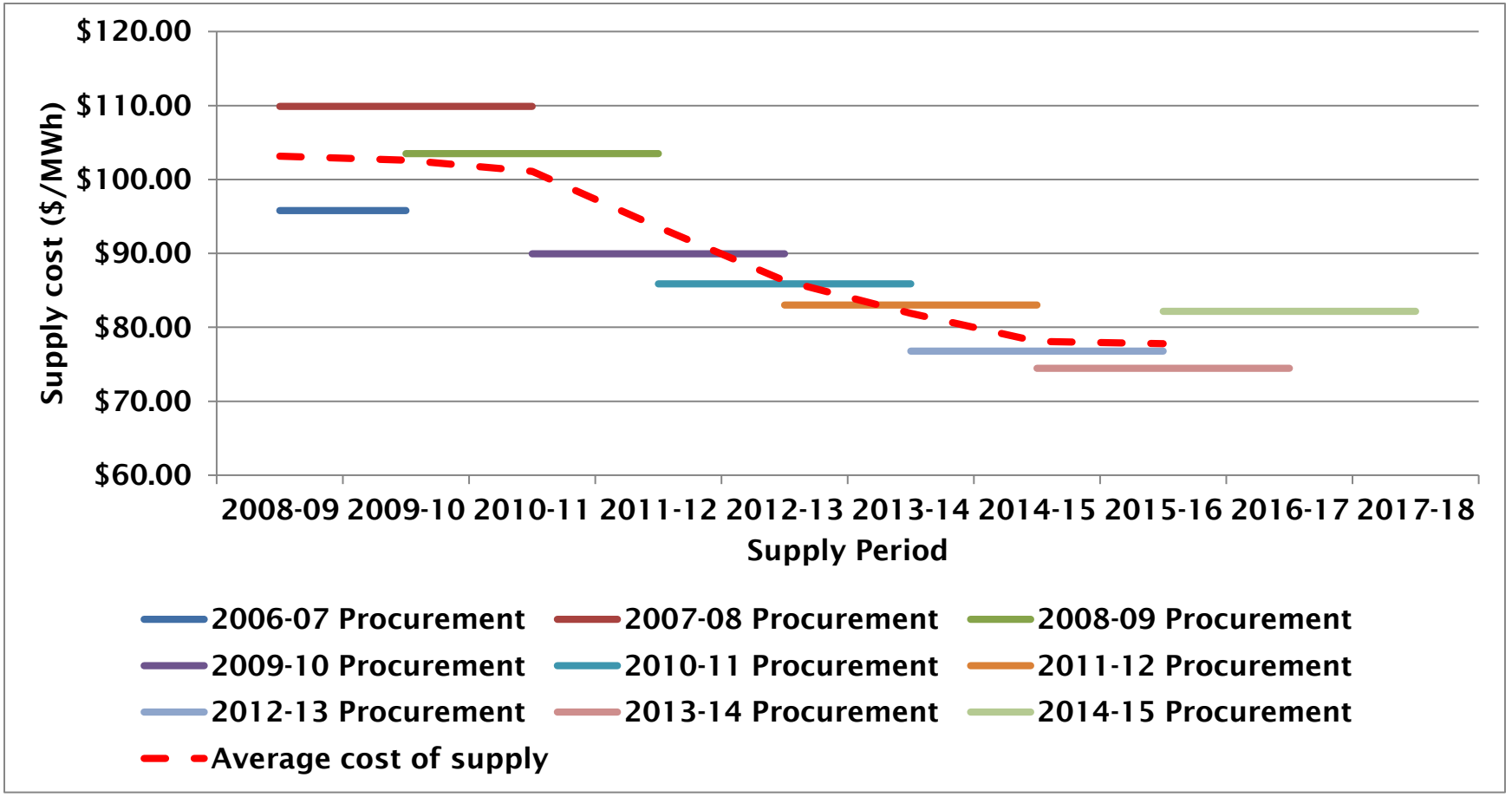


Most suppliers for Delaware SOS load are energy marketing and trading firms who do not own significant generation in PJM East

Historical Delmarva FRS suppliers	Supplier category	Description
Conectiv Energy Supply	Energy Marketer	Conectiv is now a part of DPL in Delaware
Constellation	Generation Owner	Constellation has merged with Exelon (see below)
DTE Energy Trading	Energy Marketer	Physical and financial gas and power marketing company; parent company owns utilities in Michigan
Energy America	Energy Marketer	Acquired by Direct Energy/Centrica; large retail supplier and energy marketer
Exelon	Generation Owner	Exelon Corporation owns generation (including in PJM), utility, retail supplier and energy marketing units
Hess Corporation	Energy Marketer	Acquired by DirectEnergy/Centrica; large retail supplier and energy marketer
Macquarie Energy	Energy Marketer	Macquarie is a global marketer and trader of energy products
NextEra	Generation Owner	NextEra owns generation (including in PJM), utility and energy marketing units
NRG	Generation Owner	NRG owns generation (including in Delaware), competitive retail supplier and energy marketing units
PPL EnergyPlus	Generation Owner	Now part of Talen, owns generation, retail supplier and energy marketing units
Shell	Energy Marketer	Shell is a global marketer and trader of energy products

Supply costs have declined in the last 8 years following the drop in wholesale energy market prices

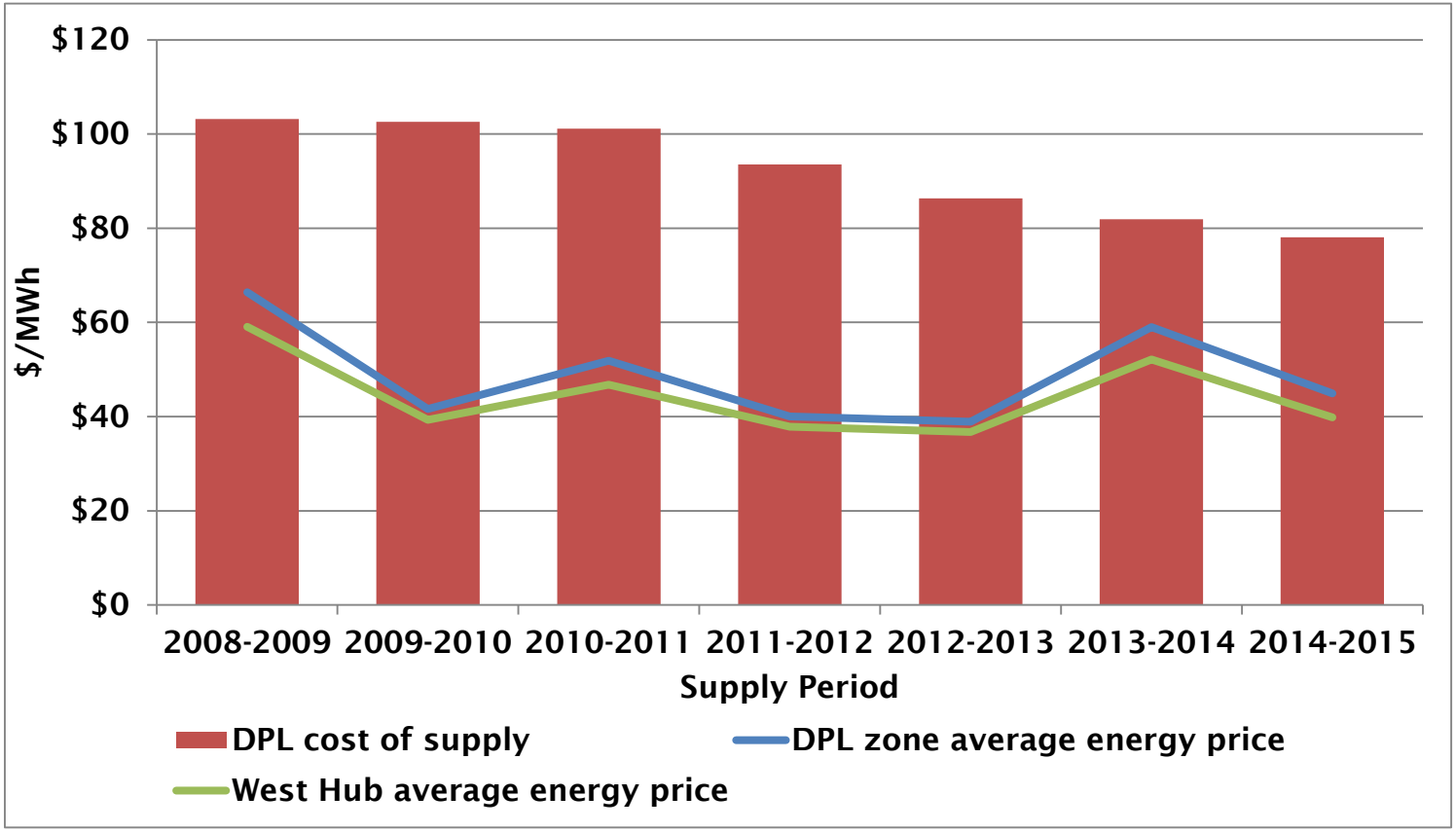
Average DPL cost of supply by supply period (RSCI customers)



DPL's laddered procurement process has had the expected effect of dampening/delaying the impact of wholesale price variations

While the FRS product includes several components, energy is the largest and most volatile

SOS RSCI customers cost of supply versus wholesale energy market prices



Two suppliers won blocks in the 2014-2015 auctions, and seven different suppliers will serve RSCI SOS load for 2015-2016

Summary of results for the 2014-2015 RFP (RSCI customers)

Winning Suppliers	• DTE Energy Trading • Exelon
Weighted average winning bid price	$82.18/MWh

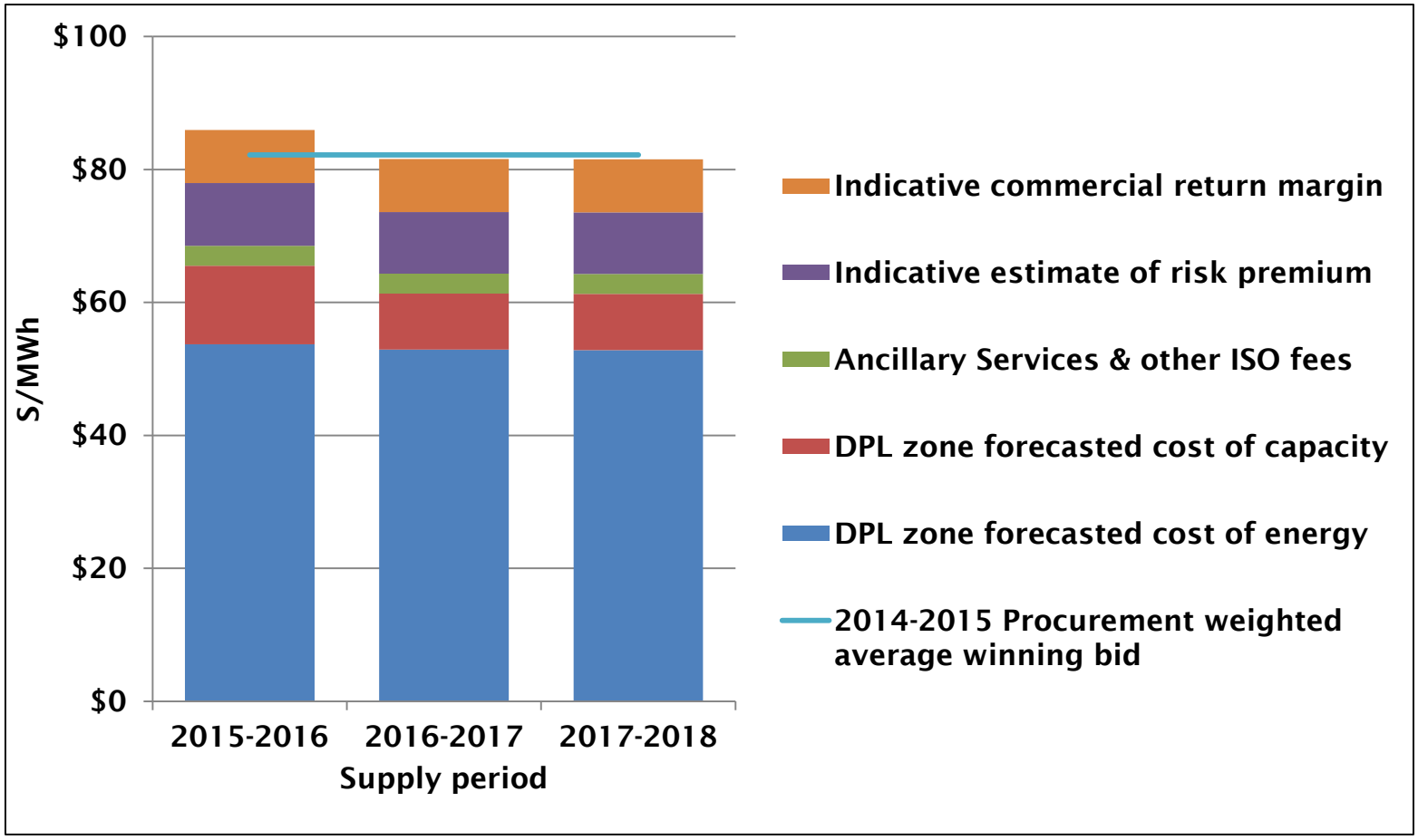
FRS suppliers for the 2015-2016 delivery period (RSCI customers) include winners from the past 3 procurement processes

FRS suppliers for the 2015-2016 delivery period (RSCI customers)

Supplier	Share of load served
DTE Energy Trading	11.1%
Energy America	11.1%
Exelon	44.4%
Macquarie Energy	11.1%
NextEra	5.6%
NRG	5.6%
Shell	11.1%
Total	100.0%

Despite low participation, LEI analysis finds the 2014-2015 procurement results to be consistent with near term expected market conditions

2014-2015 Procurement weighted average winning bid (RSCI customers) versus the forecasted DPL zone market costs



FRS product is easy to manage and risk-free for the SOS provider, but SOS suppliers must be compensated for taking on that risk

Category	Merits	Drawbacks
Attracting suppliers	• Transparent process • Similarity with other jurisdiction • Stability and consistency within procurement rules	• Uncertainty over future market prices and regulatory risks • Volumetric risk
Ensuring least cost for supply	• Supply offers tend to reflect costs of commodity in the wholesale markets • All load variations and market price risks are shifted away from SOS provider and its ratepayers to the SOS suppliers	• Suppliers build a margin in their fixed price offers to account for risks and allow for compensation for facing those risks
Providing for price stability	• SOS consumers face a relatively stable price, devoid of actual year-on-year wholesale market price fluctuations	• Price stability through longer-term contracts comes at the expense of a market risk premium built into supplier's offers • The laddered approach and resulting price averaging may also affect the development of a competitive retail market
SOS provider resources required to manage supply portfolio	• By shifting all requirements of a LSE to the suppliers, the FRS product is easy to manage for the SOS provider	• There is a cost associated with shifting all risks and management duties to the SOS suppliers

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Experiences of other jurisdictions show variation in product definition, procurement methodology, contract length and auction mechanism

Jurisdiction	Product	Renewable attributes	Number of auctions per year	Delivery term	Procurement mechanism	Simultaneous process by state utilities	Participation in recent auctions	Results of recent auctions
Delaware SOS (PJM)	FRS	Procured separately	2	3 years	Reverse auction	N/A	3 participants	$82.18/MWh
Connecticut SS (ISO-NE)	FRS and self-managed load	Included in FRS	4	6 months 1 year	Sealed bid	No	4-7 participants	N/A
D.C. SOS (PJM)	FRS	Procured separately	2	3 years	Sealed bid	N/A	3 participants	N/A
Illinois BGS (PJM)	Fixed energy blocks	Procured separately	2	Monthly over a 3 year horizon	Sealed bid	Yes	6-9 winners	N/A
Maryland SOS (PJM)	FRS	Included in FRS	2 - 4	1 year 2 years	Sealed bid	Yes	2 participants	N/A

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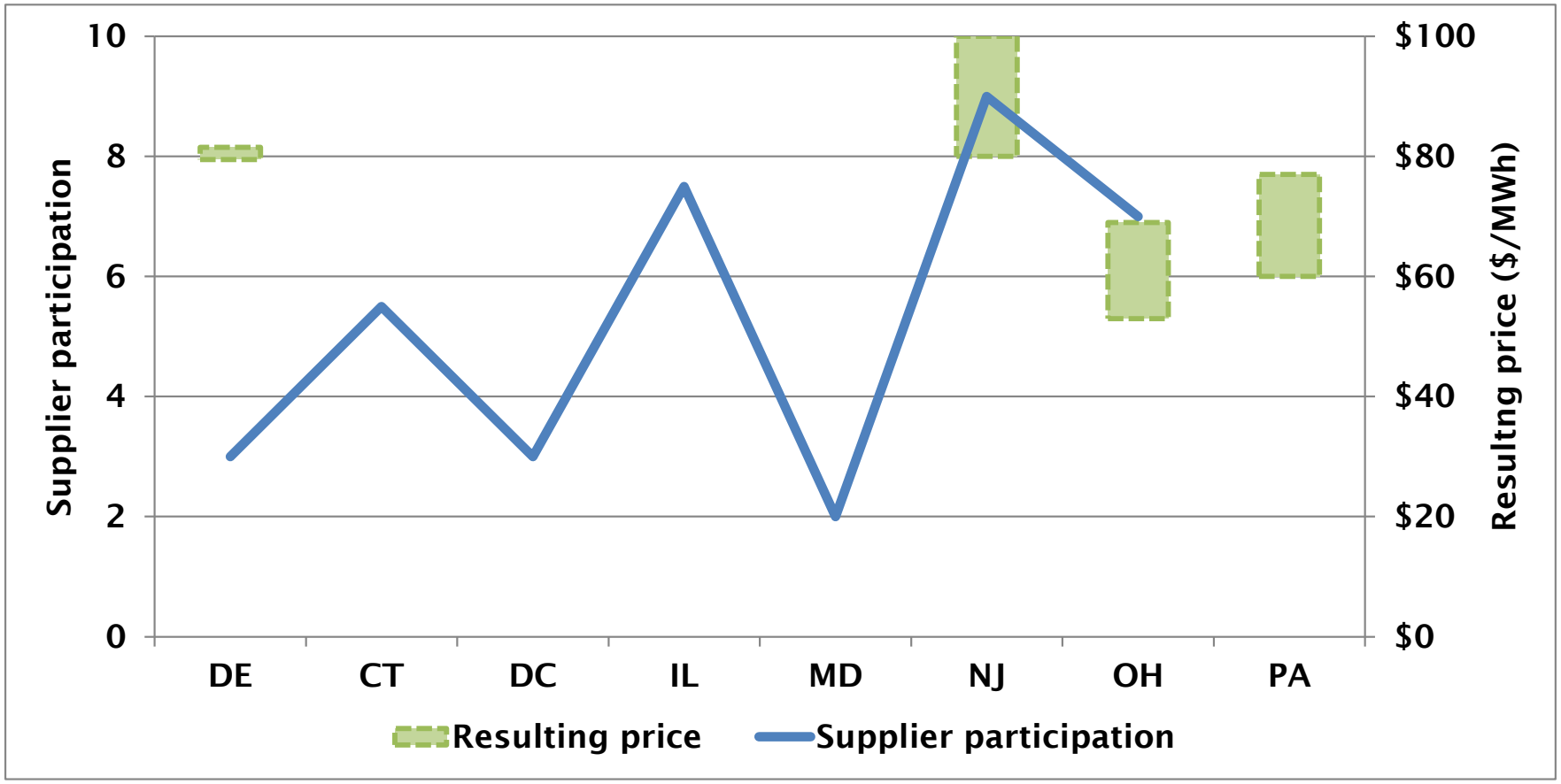
Delaware SOS (PJM)	FRS	Procured separately	2	3 years	Reverse auction	N/A	3 participants	$82.18/MWh
Massachusetts BS (ISO-NE)	FRS	Procured separately	2	1 year	Sealed bid	No	Low	N/A
New Jersey BGS (PJM)	FRS	Included in FRS	1	3 years	Descending clock auction	Yes	9 winners	$80/MWh - $100/MWh
Ohio SS (PJM)	FRS	Procured separately	2	1 year 2 years 3 years	Descending clock auction	No	6-8 participants	$53/MWh - $69/MWh
Pennsylvania DS (PJM)	FRS	Procured separately	3	6 months 1 year 2 years	Sealed bid or Descending clock auction	No	Unknown	$60/MWh - $77/MWh

Auction participation varies among jurisdictions; results driven by wholesale market costs and characteristics of the product sought

Procurement participation/results across different jurisdictions for recent auctions



Note: Participation includes number of participants or number of winners, as noted in LEI's report (Figure 16 on page 34) – information for both participants and winners was not available for all jurisdictions. The graph in the figure above represents the average number of participants across auctions held by various utilities in the same jurisdiction.

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Four evaluation criteria selected to perform an objective analysis of DPL's current procurement mechanism

LEI proposes a set of evaluation criteria from which to assess DPL's current procurement methodology with respect to alternative approaches

- Efficiency and consistency with competitive markets
- Balancing benefits and costs to ensure the least cost to consumers
- Consistency with overall Delaware policies and goals
- Ease of implementation

LEI acknowledges that stakeholders may have varying views on weights to apply to each criteria

LEI reviewed four different options for procurement strategies, which are consistent with statute and could be used in combination with one another

- Direct procurement from the PJM spot markets
- Long-term contracts
- Own generation (build/buy)
- Procurement of FRS from third-parties (Status Quo)

Direct procurement from the spot markets may reduce supply costs, but will increase risks and portfolio management requirements

Direct procurement from the spot markets

Efficiency and consistency with competitive markets	· Consistent with competitive markets; assists competitive retail markets by providing transparent opportunity costs	
Balancing benefits and costs to ensure least cost to consumers	· High transparency; market risk exists, although there are no additional risk adders to increase supply costs	
Consistency with Delaware goals	· Prices will reflect volatility in wholesale markets	
Ease of implementation	· Easy to implement; however, DPL will need trading desk, hedging strategy, credit policies, etc.	

Long-term contracts allows for a long-term supply at stable prices, but with hindsight may not be least-cost vis-à-vis other options

Long-term contracts

Efficiency and consistency with competitive markets	· Consistent with wholesale markets; can affect competitive retail markets	
Balancing benefits and costs to ensure least cost to consumers	· Less transparent; less risky if contract is below market prices and vice versa; generators may be able to finance investments on favorable	
Consistency with Delaware goals	· Allows long-term supply at stable prices (as long as prices are not indexed to wholesale spot markets); may not be least cost	
Ease of implementation	· Easy to implement, although there is a cost for solicitation and managing the contract; May also require additional procurement process for load following	

Owning generation allows for certainty of long-term supply but operational costs may fluctuate; there are regulatory and legal issues to consider

Own generation (build/buy)

Efficiency and consistency with competitive markets	· Consistent with wholesale markets; reduces competitiveness of retail markets	
Balancing benefits and costs to ensure least cost to consumers	· Operational risk; potential for lower operational costs relative to spot market prices and long-term contracts; customer migration risk	
Consistency with Delaware goals	· Allows long-term supply; operational cost may fluctuate	
Ease of implementation	· Several legal and regulatory considerations; may also require additional procurement process for load following	

Procuring FRS through auctions shifts risks to suppliers and allows (some) price stability, but may increase costs to SOS consumers

Procurement of FRS (Status Quo)

Efficiency and consistency with competitive markets	· Consistent with wholesale markets; can be made consistent with retail markets depending on product characteristics	
Balancing benefits and costs to ensure least cost to consumers	· Transparent process; lower level of risk to consumers relative to other options	
Consistency with Delaware goals	· Stable prices with laddering in the status quo, but largely dependent on product characteristics	
Ease of implementation	· Easy to implement; DPL already has the process in place	

Choice of competitive procurement design can be classified according to format

Sealed-bid RFP

- Qualified participants submit sealed offers, and the winners are chosen based on the lowest prices
- Once submitted, offers cannot be modified

Open auction

- Qualified participants can see and react to competing offers throughout the auction

Sealed-bid RFP is relatively easy to implement and allows competitive results, but not as transparent as open auction

Sealed-bid RFP

Efficiency and consistency with competitive markets	· Competitive results possible with sufficient participation	
Balancing benefits and costs to ensure least cost to consumers	· Less transparent; level of risk depends on nature of product sought	
Consistency with Delaware goals	· Can provide reliable supply at stable prices (depending on product characteristics)	
Ease of implementation	· Straightforward to implement (DPL would need to revise current process)	

Open auction design allows for competition among suppliers as the auction unfolds, but may be susceptible to gaming when participation is low

Open Auction

Efficiency and consistency with competitive markets	· With low participation, potential for strategic bidding; with high participation, close to competitive price	
Balancing benefits and costs to ensure least cost to consumers	· More transparent; level of risk depends on nature of product sought	
Consistency with Delaware goals	· Can provide reliable supply at stable prices (depending on product characteristics)	
Ease of implementation	· Generally more complex than sealed bid; however easier in light of DPL's current process	

Characteristics of the FRS product can affect supplier participation and resulting prices

Product / Auction characteristics	Potential impacts on suppliers and consumers	
Holding auctions outside periods of high volatility in wholesale markets	↑ Supplier Participation	↓ Price volatility for consumers
Increasing the frequency of auctions	↓ Dependency on particular market conditions	↑ Administrative costs for SOS provider
Decreasing the contract term	↓ Market risks for suppliers	↑ Price volatility for consumers
Combining different terms within the same auction	↑ Supplier participation	↑ Auction complexity
Increasing the block size	↑ Risk for smaller suppliers	
Parting out the components of FRS	↓ Administrative burden for suppliers	
Procuring fixed quantities	↑ Pool of potential suppliers	↑ Risk for SOS provider
Using a single auction clearing price	↑ Consistency in pricing for identical products	

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How would you rank the four evaluation criteria?

- Efficiency and consistency with competitive markets
- Balancing benefits and costs to ensure the least cost to consumers
- Consistency with overall Delaware policies and goals
- Ease of implementation

1.

2.

3.

4.

A combination of procurement strategies could help balance multiple criteria that are otherwise conflicting

Options for modifying the procurement process

Direct procurement from the spot markets	· Market volatility · No 'middleman' to increase prices · Resource requirement to manage portfolio · …
Entering into long term contracts	· Practical considerations since output does not match load · Fixed Price · Discrepancy with wholesale market prices · …
Owning generation	· Risk during generator outage · Potential mitigation in capacity markets · Subject to fuel costs · …
Full Requirements Service	· No risks for consumers but risk premium built into supplier offers · Price stability · Easy to manage for SOS provider · …

Discussion of alternative procurement strategies

How do you perceive a portfolio approach – where load is procured via a combination of SOS auctions, spot market purchases, long term contracts and/or building/buying generation?

- [To summarize comments from workshop participants - live]

Discussion of alternative procurement strategies

Should DPL consider building its own generation? What are the practical considerations that would need to be taken into account ?

- [To summarize comments from workshop participants - live]

Discussion of alternative procurement strategies

What characteristics would make a long-term contract beneficial to consider ?

- [To summarize comments from workshop participants - live]

The auction design can affect supplier bidding strategies and ultimately the outcome of the auction

Options for changing the procurement/auction format

Sealed-bid RFP	· Easy to implement · Forces suppliers to submit 'best offer' · …
Open auction	· Reverse auction (multiple clearing prices) vs. descending clock auction (single clearing price) · Potential for strategic bidding when low participation · Open process · …

Discussion of alternative procurement strategies

What are the advantages and disadvantages of the reverse auction process over the sealed-bid format previously implemented in Delaware, particularly in light of lower participation observed in recent DPL auctions?

- [To summarize comments from workshop participants]

Discussion of alternative procurement strategies

What other open auction variations could be employed ?

- [To summarize comments from workshop participants]

Choosing the right product characteristics to reach procurement objectives and incentivize supplier participation

Options for changing the FRS product characteristics

Changing contract length
Offering a mix of different product terms
Procuring fixed quantities of power
Separating different components of FRS
Changing the timing of the auctions
Increasing/decreasing the frequency of auctions
Changing the block size
…

Discussion of product characteristics

How do you define price stability? Is there a general limit in annual price variation which is acceptable?

- [To summarize comments from workshop participants - live]

Discussion of product characteristics

What are the advantages and disadvantages of increasing/reducing the FRS contract term (currently 3 years), or combining different terms within the same auction?

- [To summarize comments from workshop participants - live]

Discussion of product characteristics

Would changing the timing of auctions (currently occurring in the winter months) affect the participation level, cost of supply or stability of prices?

- [To summarize comments from workshop participants - live]

Discussion of product characteristics

Should the block size be revised? If yes, should it to be smaller or larger?

- [To summarize comments from workshop participants - live]

Discussion of product characteristics

Should an energy-only product be procured, instead of the FRS product? What about fixed-quantity energy blocks ?

- [To summarize comments from workshop participants - live]

Discussion of product characteristics

Should DPL solicit for energy deliveries at a major trading hub and manage congestion internally ?

- [To summarize comments from workshop participants - live]

Discussion of product characteristics

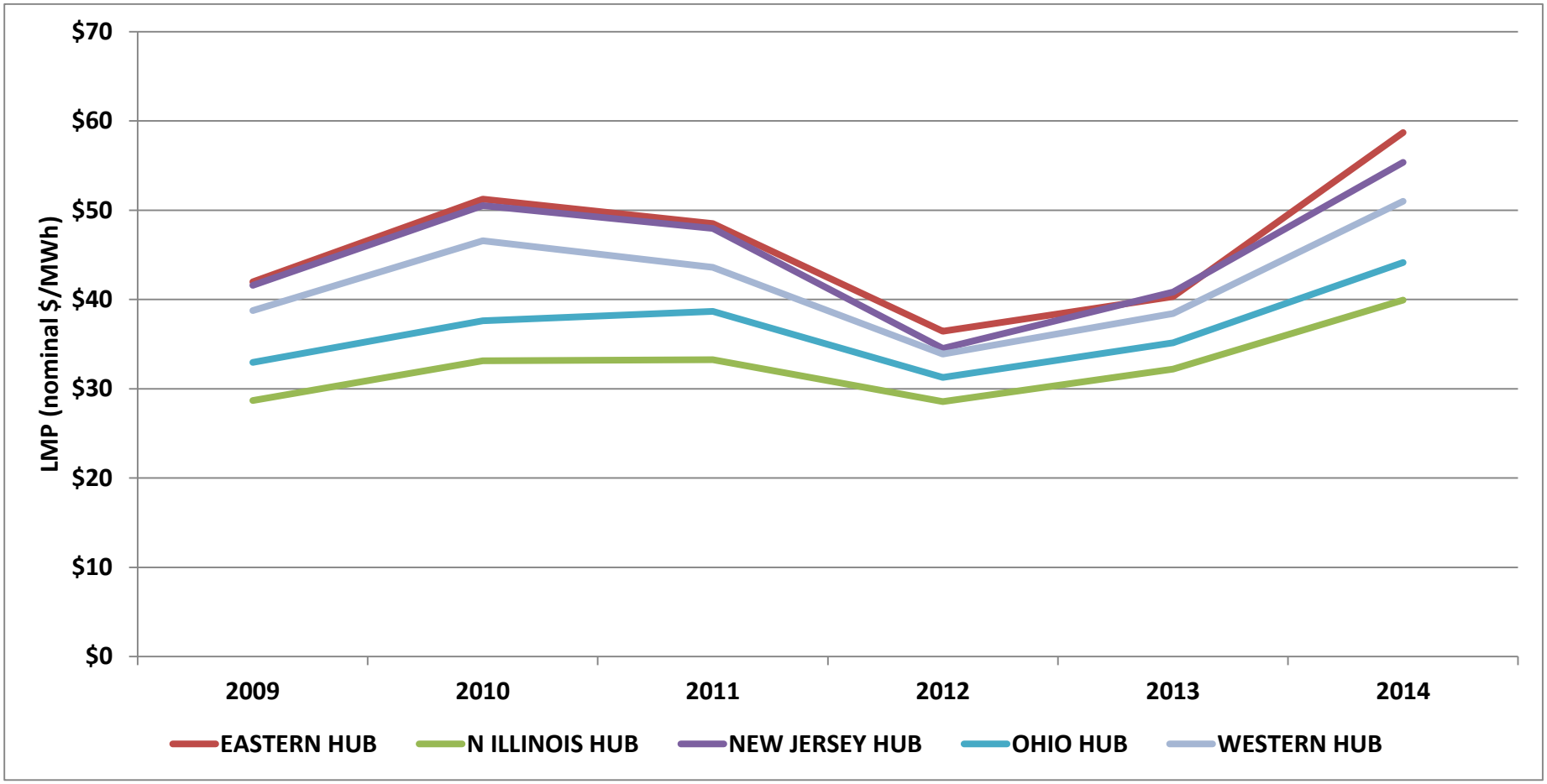
Are there any other modifications in procurement process, auction design/format and product/auction characteristics that you would like to suggest?

- [To summarize comments from workshop participants - live]

The underlying cost of electricity in the DPL zone are higher than in other PJM zones

Due to transmission constraints, energy-related costs are higher in the Delmarva Peninsula than in the rest of PJM

Historical annual energy prices across PJM



Discussion of the underlying costs of electricity in the DPL zone

What transmission, generation or demand-side solutions could help lower electricity costs in the DPL zone ?

- [To summarize comments from workshop participants - live]

Open discussion

Any additional comments?

- [To summarize comments from workshop participants - live]